

# A NEW SPECIES OF *VIOLA* (VIOLACEAE) FROM THE GUADALUPE MOUNTAINS, TRANS-PECOS TEXAS

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## ABSTRACT

The only yellow-flowered *Viola* known to exist in the Guadalupe Mountains, Texas, is described as *V. guadalupensis*. The rock-dwelling new species is known from a single, small limestone formation on the East Rim of the mountains, and is an immediate candidate for endangered status. The new species is related to *V. vallicola* and *V. nuttallii* of northern New México and western United States, and is also similar to *V. painteri* of northern México.

## RESUMEN

La única *Viola* con flores amarillas en las montañas Guadalupe, Texas, se describe como *V. guadalupensis*. La especie, que vive (existe) entre las piedras, se reconoce de una sola, pequeña formación de piedra caliza en la Orilla al Este de las montañas, y es candidata inmediata para estado o posición de peligro. La nueva especie está relacionada a *V. vallicola* y *V. nuttallii* del norte de nuevo México y el oeste de los Estados Unidos, y es también semejante a *V. painteri* del norte de México.

During the course of photographic studies of plants in Guadalupe Mountains National Park, Ranger Brent Wauer discovered an undescribed yellow-flowered violet growing in one small rock formation along the East Rim of the Guadalupe Mountains. Photographic, ecologic, and other data in addition to those presented below for the new species of *Viola* are included in the extensive photographic collection of plants housed in Guadalupe Mountains National Park headquarters at Pine Springs.

*VIOLA guadalupensis* A.M. Powell and B. Wauer, sp. nov. Fig. 1.

Plantae perennes quasi glabrae usque ad 10 cm altae. *Laminae foliorum ovatae vel ovati-lanceolatae*, 1.2–2.4 cm longae, 0.7–1.2 cm latae, glabrae vel trichomatibus paucis secus venas paginarum inferiorum, *margines integrae vel parve crenatae in dimidio proximali*. *Corolla flava*, *petala 7–10 mm longae*, *petalum infernum venis prominentibus brunneis*; *styli ca 1.5 mm longi capitati*. *Fructus stramineus 3.0–4.5 mm longus*; *semina ovoidea ca 2 mm longa*.

Perennial in small openings of *limestone rock face*, plants to 10 cm tall. Stems glabrous, 1–4 cm long (those parts collected from rock openings). Leaves caulescent; petioles glabrous, 2–6 cm long; stipules 3–11 mm long, 0.5–1.8 mm wide, lanceolate to ovate- or oblong-lanceolate, or linear, whitish to greenish and thin, sparingly glandular-fimbriate; *blades ovate to triangular-ovate or ovate-lanceolate, 1.2–2.4 cm long, 0.7–1.3 cm wide, glabrous* or with a few short hairs especially along veins underneath, the margins entire or with 1–3 crenations on lower half, apex acute to rounded, the tip rather obscurely callused, the *base broadly cuneate* to rounded or truncate. Flowers borne among or above the upper leaves, pedicels-peduncles 3.5–6 cm long, glabrous, slender; sepals glabrous, linear to linear-lanceolate, 3.5–5 mm long, margins scarios, the base truncate or rounded to subauriculate; *corollas yellow, fading reddish brown*, some of the petals smeared reddish-brown outside, inconspicuously brown-veined (middle veins) near base and inside on lateral petals, *prominently brown-veined* (middle and diverging veins) *on lower (spurred) petal*, the petals 7–10 mm long, the two lateral petals bearded inside; spur 1–1.3 mm long; anthers 1.5–2 mm long; terminal appendages 1–1.4 mm long; nectariferous spurs ca 1 mm long; styles ca 1.5 mm long, capitate, with short hairs on 2 margins. Fruit greenish, maturing tan, glabrous, 3–4.5 mm long; *seeds ovoid, ca 2 mm long, light brown, with a well developed caruncle*, off-white to tanish in color, extending back along the seed from nearly one-half to almost the entire length of the seed.

TYPE: TEXAS. CULBERSON CO.: Guadalupe Mountains of Guadalupe Mountains National Park, N side of prominent rock face (no map name), along E Rim, 1.48 km N, 1.0 km E of the summit of Hunter Peak; ca 35 scattered plants on a 7 X 10 m rock face sheltered by vegetation; elev. 2600 m (8000 ft); collected by B. Wauer who found plants growing in "bullet-hole" openings in rock faces where roots could not be collected without damage; 12 May 1988, A.M. Powell and B. Wauer 5497 (HOLOTYPE: SRSC; ISOTYPE: TEX).

Known only from the type collection.

*Viola guadalupensis* is named after the only mountain range in which it is known to occur. In fact, the plants are known only from one northwest-facing dolomitized limestone outcrop (with small ledges), shaded by *Pseudotsuga menziesii* (Douglas Fir), on the East Rim of the Guadalupe Mountains. Associated plant species on the rock outcrop include *Petrophytum caespitosum*, *Valeriana texana*, *Pinaropappus parvus*, *Chaetopappa hersheyi*, *Stipa lobata*, and *Carex* sp., and at the base of the rock outcrop *Fendlerella utabaensis*, *Ptelea trifoliata*, *Cercocarpus montanus*, var. *argenteus*, *Fendlera rupicola*, *Amelanchier utabensis*, *Physocarpus monogynus*, and *Cheilanthes* sp. The second author has carefully examined other seemingly suitable habitats in the Guadalupe Mountains including those along about 8 km (5

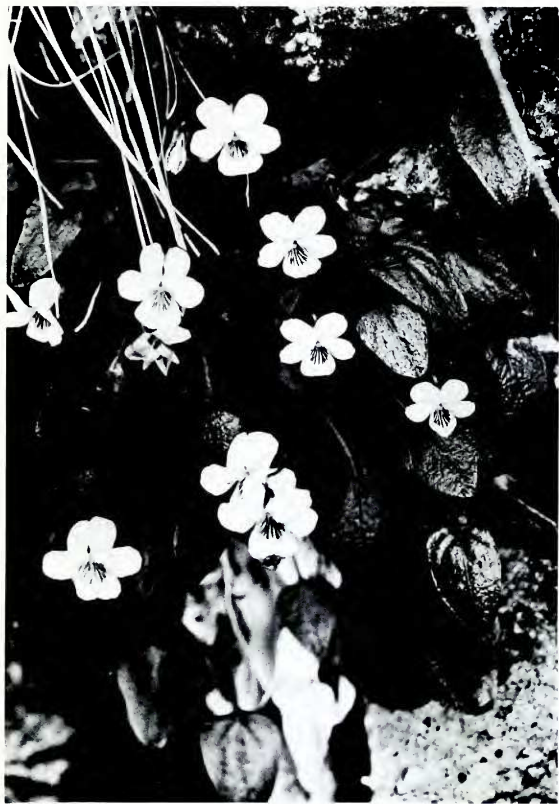


FIG. 1. Habit of *Viola guadalupensis*, Guadalupe Mountains, Texas.

mi) of the East Rim from the top of Bear Canyon to Lamar Canyon without locating any additional plants. The entire known population of *V. guadalupensis* comprises about 35 individuals in the one site.

Two other species of *Viola* are known to occur in the Guadalupe Mountains, *V. lovelliana* Brainerd and *V. missouriensis* Greene, both blue-flowered taxa (Correll and Johnston 1970; Russell 1965; Burgess and Northington 1981). *Viola guadalupensis* is the only known yellow-flowered violet in the Guadalupe Mountains, and it appears to be related to *V. vallicola* A. Nels. and *V. nuttallii* Pursh, yellow-flowered species of the western United States with closest distribution in southern Colorado or northern New Mexico (Martin and Hutchins 1984; Fabijan et al. 1987). *Viola guadalupensis* differs from *V. vallicola* and *V. nuttallii* by its rock-dwelling habit, leaf characters (especially the blade shape and pubescence), fruit size, and seed morphology (Table 1). *Viola guadalupensis* also exhibits generally smaller vegetative and floral features than *V. vallicola* and *V. nuttallii*. Morphological traits suggest closest relationship with the diploid *V. vallicola*. A chromosome count of *V. guadalupensis* will be very helpful in clarifying its relationship in the *V. nuttallii* complex (Fabijan et al. 1987, Baker 1957).

*Viola guadalupensis* is also similar to the yellow-flowered *V. painteri* Rose & House, a species of pine-fir woodlands in the Sierra Maderas del Carmen in Coahuila, south to Oaxaca, in Mexico (Rose and House 1905, Henrickson, pers. comm.). *Viola painteri* and *V. barroetana* Schaffner may be the only yellow-flowered violets in northern Mexico (Nesom, pers. comm., Baker 1957). *Viola guadalupensis* is delimited from *V. painteri* by its rock-dwelling habit, glabrous herbage, ovate to ovate-lanceolate leaf blades that are smaller and narrower with margins entire or sparingly crenate on the lower half, apexes acute or rounded, broadly cuneate to rounded or truncate leaf bases, shorter sepals and petals, and smaller fruits and seeds. *Viola painteri* has herbage glabrous to pubescent, leaf blades cordate to reniform, 1–3(-5) cm long, 1–2(-4) cm wide, apexes acute, bases cordate, margins evenly crenate-serrate, fruit 7–9 mm long, and seeds ca 2.5 mm long. Baker (1957) suggests that *V. vallicola* may have arisen from *V. barroetana* although Fabijan et al. (1987) do not discuss this possibility, and we have not compared *V. guadalupensis* with *V. barroetana*.

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TABLE 1. Some distinguishing features of *Viola guadalupensis* and related species.

	V. GUADALUPENSIS	V. VALLICOLA	V. NUTTALLII
Substrate	Rock crevices	Soils	Soils
Leaf blades	Ovate to triangular-ovate or oblong-lanceolate, 1.2–2.4 cm long, 0.7–1.3 cm wide, the base broadly cuneate to rounded or rarely truncate, glabrous throughout or with a few short hairs along veins underneath, margins entire or 1–3-crenate on lower half	Ovate to oblong-ovate, 1.9–7 cm long, 0.9–3 cm wide, the base truncate to subcordate, sparsely to densely puberulent throughout or glabrous, but often puberulent along veins and margins if glabrous on the surfaces, margins usually ciliate, entire to crenulate	Mostly lanceolate, 2.5–7.5 cm long, 0.6–3.2 cm wide, the base attenuate, surfaces glabrous to rather sparsely puberulent especially along the veins underneath, margins ciliate, entire to crenulate mostly on lower half
Fruit	3–4.5 mm long, glabrous	(5)6–8 mm long, glabrous to densely puberulent	7–11 mm long, glabrous to puberulent
Seeds	ca 2 mm long, 1.2–1.4 mm wide, ovoid with an off-white to tanish caruncle well developed (not distally flattened) and extending back along the seed from nearly one-half to almost the entire length of seed	2.2–2.7 mm long, 1.2–1.5 mm wide, ovoid with a whitish caruncle ca 0.8 mm long and distally flattened	2.8–3 mm long, 1.5–1.8 mm wide, ovoid, with a whitish caruncle, ca 1 mm long and distally flattened
Chromosome Number	Unknown	2n = 12	2n = 24

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## REFERENCES

- BAKER, M. S. 1957. Studies in western violets — VIII. The Nuttalianae continued. *Brittonia* 9:217 — 230.
- BURGESS, T. L. and D. K. NORTHINGTON. 1981. Plants of the Guadalupe Mountains and Carlsbad Caverns National Parks. Chihuahuan Desert Res. Inst., Contr. No. 107, Alpine, TX.
- CORRELL, D. S. and M. C. JOHNSTON. 1970. Manual of the Vascular Plants of Texas. Texas Research Foundation, Renner, Texas.
- FABIJAN, D. M., J. G. Packer, and K. E. Denford. 1987. The taxonomy of the *Viola nuttallii* complex. *Canad. J. Bot.* 65:2562 — 2580.
- MARTIN, W. C. and C. R. HUTCHINS. 1984. Spring Wildflowers of New Mexico. Univ. of New Mexico Press, Albuquerque.
- ROSE, J. N. and H. D. House. 1905. Descriptions of three Mexican violets. *Proc. U.S. Natl. Mus.* 29:443 — 444.
- RUSSELL, N. H. 1965. Violets (*Viola*) of Central and Eastern United States: an introductory survey. *Sida* 2:1 — 113.